27

With the Compliments of

Alexander Agassiz.

ANNUAL REPORT

OF

THE CURATOR

OF THE

MUSEUM OF COMPARATIVE ZOÖLOGY

AT HARVARD COLLEGE,

TO THE

PRESIDENT AND FELLOWS OF HARVARD COLLEGE,

FOR

1885-86.

CAMBRIDGE:
UNIVERSITY PRESS: JOHN WILSON AND SON.
1886.

ANNUAL REPORT

OF

THE CURATOR

OF THE

MUSEUM OF COMPARATIVE ZOÖLOGY

AT HARVARD COLLEGE,

TO THE

PRESIDENT AND FELLOWS OF HARVARD COLLEGE,

FOR

1885-86.

CAMBRIDGE:
UNIVERSITY PRESS: JOHN WILSON AND SON.
1886.

FACULTY OF THE MUSEUM.

CHARLES W. ELIOT, *President.*

ALEXANDER AGASSIZ, *Curator.*
JOSIAH D. WHITNEY, *Secretary.*
THEODORE LYMAN.
GEORGE L. GOODALE.

OFFICERS.

1886

ALEXANDER AGASSIZ	*Curator.*
JOSIAH D. WHITNEY	*Sturgis-Hooper Professor of Geology.*
HERMANN A. HAGEN	*Professor of Entomology.*
NATHANIEL S. SHALER	*Professor of Palæontology.*
E. L. MARK	*Hersey Professor of Anatomy.*
W. M. DAVIS	*Assistant Professor of Geography.*
J. ELIOT WOLFF	*Instructor in Lithology.*
HOWARD AYERS	*Instructor in Zoölogy.*
THEODORE LYMAN	*Assistant in Zoölogy.*
WALTER FAXON	*Assistant in Zoölogy.*
D. D. SLADE	*Assistant in Osteology.*
SAMUEL GARMAN	*Assistant in Herpetology and Ichthyology.*
M. E. WADSWORTH	*Assistant in Lithology.*
J. W. FEWKES	*Assistant in charge of Invertebrates, and of the Newport Marine Laboratory.*
WILLIAM BREWSTER	*Assistant in Ornithology and Mammalogy.*
ALPHEUS HYATT	*Assistant in Palæontology.*
MISS F. M. SLACK	*Librarian.*

REPORT.

To the President and Fellows of Harvard College: —

During the past year the following courses of instruction have been given at the Museum: —

A course in Biology, by Professors Farlow and Faxon.

An advanced course in Zoölogy, by Professor Faxon.

A special course in Cryptogamic Botany by Professor Farlow, who also devoted considerable time to advanced students and others wishing to carry out original investigations.

General Lectures by Professor Mark, who had charge also of the Embryological Laboratory, and gave a course in Microscopic Anatomy.

Professor Faxon took charge of the general Biological Laboratory, assisted by Mr. Nolan.

Professors J. D. Whitney, Shaler, and Davis gave the usual courses in Geology, Palæontology, and Physical Geography.

For the details of the courses I would refer to the accompanying special Reports.

In addition to the regular instruction of the University, a number of courses were given by Assistants of the Museum to persons interested in special topics. I may mention the course of Dr. Slade in Comparative Osteology, and of Dr. Fewkes on the Natural History of Marine Invertebrates. These courses were well attended, and it would be a proper recognition of their value to make them as far as practicable part of the regular courses of instruction.

In all the Departments of the Museum the Assistants have devoted considerable time to special students who came to Cambridge merely for a limited time. Professor Hagen, Dr. Slade, Mr. Garman, Professor Hamlin, Mr. Brewster, Professor Hyatt, and Dr. Fewkes, have all given assistance to visitors in their respective Departments.

The unexpected demand for instruction is in excess of our accommodation, and I regret to say that we are again compelled, for want of Laboratory space, to occupy rooms in the older sections of the Museum intended for a very different purpose. This is unfortunate, as any such temporary arrangements must be wasteful. Besides, some of the courses of instruction have on this account been removed from their natural connection with the Library and apparatus to other buildings. It will be absolutely essential, in order to maintain the unity of organization on which so much care and money have been expended, to provide additional quarters for the accommodation of the increasing number of students, and the natural demands for expansion in the specialties of each Department. At the present moment an additional section of the Museum would barely meet our requirements.

Considerable attention has been paid to the improvement of the Laboratories, and to the increase of their equipment.

At the Marine Laboratory at Newport, Dr. Fewkes has had the charge of two students. He has continued his work on the development of Echinoderms, and I have spent some time on the Embryology of Bony Fishes.

As usual, a large amount of material has been sent to various institutions and individuals for study. I may mention specially the Zoölogical Society of London, the Smithsonian, the Peabody Academy, Messrs. Ridgway, Ayers, Drs. Bauer, Meriam, Murray, Spengel, Royer, Wilder, and Professors Allen, Lacaze-Duthiers, and Marsh.

Professor Lesquereux, to whom had been sent our extensive material of Fossil Plants from the Dakota group, has returned the specimens, as well as a series of specimens from the Laramie group and a number of carboniferous plants. The cretaceous specimens, as he says, have been of the greatest use to him, and the new material will be incorporated in a volume on fossil plants which he is preparing for publication by the Geological Survey of the United States. The carboniferous species have been published in his Flora of the Carboniferous Period of the United States.

Excellent progress has been made during the past year with the Reports on the " Blake " collection.

The collection of Blake Holothurians has been returned by Dr. H. Théel, who kindly undertook their examination, and he has also sent his Report on them. This is now passing through the press.

Mr. Dall has also sent back to the Museum the greater part of the Blake Mollusca intrusted to him, and the first part of his Report, that on the Pelecypods, has been published in the twelfth volume of the Bulletin. It is accompanied by six excellent plates, due to the pencil of Dr. McConnell. Mr. Dall has also kindly selected a set of the Mollusca for the Smithsonian examination.

The results of a portion of the Blake Fishes collected in the Gulf of Mexico in 1877–79 have been published by Professor Goode and Dr. Bean in the Museum Bulletin.

Professor Ehlers, of Göttingen, has also sent the manuscript of his Report on the Florida Annelids. This is now in press, and will form a number of the Memoirs.

I have myself completed the text of the general Report on the Explorations of the " Blake." This is in type, and only awaits the completion of the illustrations for publication.

Among other publications well under way I may mention a memoir by Mr. Garman on Sharks and Skates. A part of the material was prepared at various times by Professor L. Agassiz before his death. His notes, drawings, and the preparation made by Professor Wilder, who assisted him during a part of this investigation, have all been incorporated into Mr. Garman's work.

Among the more valuable accessions of the Museum I mention a small collection of Birds from Mexico purchased from Mr. Toro; collections of Fishes and Reptiles sent in exchange by the Imperial Academy of St. Petersburg; a fine set of triassic footprints from New Jersey, presented to the Museum by Mr. John Eyermen; interesting specimens of modern chalk, so called, from Oahu, sent us by Prof. W. D. Alexander; a collection of Crustacea, made by the " Albatross," and selected by Prof. Sidney I. Smith, presented by the Smithsonian Institution; and additional specimens of Huronian Fishes collected by Jay Terrell.

We have continued to fill gaps in our series of Birds and Mammals through Prof. H. A. Ward, and some interesting skeletons of whales have been received from him. They have been hung in the main hall adjoining the Atlantic Exhibition Room, of which they form a part.

Specially worthy of notice is a large collection of Central American Longicorns, compared with the types of the great work of Messrs. Godman and Salvin on the Zöology of Central America, which we owe to Messrs. Godman and Salvin.

A fine collection of California Birds has been presented by Mr. King.

To the Peabody Academy of Sciences of Salem we are again indebted for large additions to our collections of Fishes, Reptiles, Crustacea, Worms, and Insects. In many of the groups, the number of types contained in them renders this gift peculiarly valuable.

A number of casts of fossil Vertebrates have been sent us by the Museums of Lyons, Prague, and Munich. The Museum has also purchased a good collection of palæozoic fossil corals from Mr. Green, of New Albany, Indiana.

A large collection of Bohemian Cretaceous and Tertiary Fossils has been received from the Prague Museum. This collection takes the place of the Silurian Fossils left us in his will by the late Joachim Barrande, which would merely have duplicated the Schary collection of that period already in the Museum. A large number of glass models of Marine Invertebrates have been added to our series.

Finally, a number of samples of bottom deposits, collected by the "Blake," have been sent us by the United States Coast Survey. These, with a few additional interesting specimens from our former collections, have been sent to Mr. John Murray for study. An assortment of Atlantic bottom deposits has also been sent to Messrs. Norman and Brady. A number of alcoholic specimens have been purchased from the Naples Zoölogical Station. Dr. Horn has kindly continued to fill the gaps in our collection of North American Coleoptera.

The Museum is again indebted to Messrs. Brewster, Cabot, Slade, and Lyman, for their interest in behalf of their respective departments.

As will be seen from Professor Hyatt's Report, he has made an excellent beginning in the laborious work he has undertaken of arranging and preparing for exhibition our vast stores of Fossil Invertebrates. He has been assisted in this by Mr. Jackson.

From the reports of the different Assistants, the condition of the collections continues excellent. We are little by little improving those placed on exhibition. The Crustacea and Worms are now, according to Professors Faxon and Mark, in safe condition, and the surplus material unavailable for our use has been disposed of in these groups, as well as in the Radiates, Dr. Fewkes having now completed his revision of the collections in his charge. Mr. Brewster and Dr. Slade report excellent order in the store and exhibition rooms of Birds and Mammals. Mr. Garman has continued to weed out useless material from the Fishes and Reptiles. Dr. Hagen reports the Entomological Collection as peculiarly free from pests. It is somewhat strange that it is the Palæontological Collection which at the present moment is in the poorest condition in that respect. A species of Lepisma has been found doing considerable damage to old labels of specimens which had been kept packed away in the dark, or which had become slightly damp during transportation to the Museum, and which had not been examined since they were received.

The Atlantic and Pacific Rooms are now cased, and will be arranged for exhibition as soon as practicable. Some work has also been done in the Palæontological Exhibition Rooms. The casts of the larger Vertebrates from the Marsh Collection of the Jurassic and Cretaceous period have been mounted in the place they are destined to occupy, and two large casts have likewise been placed in the Tertiary Room.

The difficulty we experience now in filling gaps in the faunal collections is well exemplified by the trouble Dr. Hagen has found in making up his part of the faunal entomological exhibits. Yet our Entomological Collection is considered a fairly good one.

A list of the Museum Publications issued during the past academic year is given in Appendix A of this Report. They consist of five numbers of the Bulletin, completing the twelfth volume of that series, and of one number of the Memoirs. An addition to the list shows the Memoirs and Bulletins in preparation, and with each special Report will be found a list of the publications of the Assistants of the Museum, or of publications based upon the materials of the institution, or investigations carried on by the Professors and students of the University in our laboratories.

There have been about 600 volumes and over 1,300 pamphlets added to the Library during the past year. From the Vienna Academy and the Odessa Natural History Society we have received extensive exchanges for our publications.

There have been extensive changes in the personnel of the Museum during the past year, owing to the death of Professor Hamlin and to the resignations of Professor Faxon and Dr. Whitman. The care of the collections intrusted to Professor Hamlin has for the present been subdivided. The Fossil Vertebrates pass into the hands of the Assistants in charge of each class. The Fossil Invertebrates are placed in the care of Professor Hyatt, while all the recent Invertebrates with the exception of Insects are now supervised by Dr. Fewkes. It is hoped that this arrangement, a more natural one, may become permanent, and that, as our additions are not likely to be very large hereafter, they may be cared for by the present staff, especially now that the Zoölogical Exhibition Rooms are nearly complete. Whenever the Marine Faunæ are open to the public, they will need but little attention.

Dr. Whitman has accepted the direction of a new Zoölogical Laboratory recently established at Milwaukee; but I shall have his co-operation in completing as fast as possible under these new conditions the Memoir on the Development of Bony Fishes, now under way.

Professor Faxon's resignation is a great loss to the Museum. Associated with it for a long period as assistant and instructor, he had become identified with its interests, and it will be difficult to fill his place by one as devoted to the interests of the Museum, or who will succeed as well as Dr. Faxon has done in interesting the large classes which he taught so successfully for many years.

The death of Professor Hamlin has removed one of the two older Assistants whose appointment antedates my accession to the care of this institution. Professor Hamlin had the reputation of being a most exact and critical naturalist, and, as a representative of the older school of workers, was during his life a most valuable assistant. He had a most extensive acquaintance with Mollusks both recent and fossil, and was most painstaking and methodical in his Museum work. To this he sacrificed most of his time, so that his routine work prevented him from publishing much original matter, — his extensive correspondence and exchanges with malacologists all over the world being a task which taxed his time to the utmost.

The number of visitors to the Museum is constantly increasing, and on Sundays or holidays the rooms are frequently most uncomfortably crowded. To facilitate access to the Exhibition Rooms, it has been found necessary to begin the erection of a suitable staircase outside of the building, as the temporary staircase is no longer sufficient to accommodate the stream of visitors; and it has been found impracticable to make use of the large staircase of the Laboratory building. This addition will enable us to isolate the Museum of Comparative Zoölogy from the Laboratories, and from the other departments of Natural History, and to devote to it the wing containing the Exhibition Rooms, in which the collections are stored.

ALEXANDER AGASSIZ.

Cambridge, October 1, 1886.

REPORT ON THE GEOLOGICAL DEPARTMENT.

By Josiah D. Whitney, *Sturgis-Hooper Professor of Geology.*

During the year 1885–86, a course of lectures, about sixty in number, on Economical Geology, was given by the Professor to a class consisting chiefly of undergraduates (Seniors), with a few candidates for a higher degree. Most of his time not thus occupied was devoted to the preparation of the article "United States" for the new edition of the Encyclopædia Britannica. In connection with this work material was collected and illustrations gathered for a course of lectures to be given during the College year 1886–87, on the material resources of the United States. In this course everything bearing on the development of these resources, with reference to the past, the present, and the possible and probable future, will be discussed, so far as can be done in the allotted time. The statistics of every important branch of industry will be presented, with an analysis of the climatic, geographical, and geological conditions having relation to the development of that industry. The investigation of the relations of climate to man, in all aspects, will be a special feature of the course, which is intended to be, in fact, an introduction to all earnest study of history and political economy, but always with particular reference to conditions prevailing in the United States.

A considerable amount of time has also been given to the study of the origin and meaning of some of the more difficult words in physical geography, geology, mining, and metallurgy for the Century Company's Dictionary of the English Language.

Field work has been continued in connection with the investigations of the surface and glacial geology of North America, mentioned in the last Report as having been begun. Portions of the supposed "terminal moraine" in Wisconsin, Minnesota, and Dakota, and also in New Jersey, have been examined with care, and considerable work has been done in the New England States, as well as in Northern New York, with the same object in view.

Professor Wadsworth spent a portion of the year in Cambridge, arranging the lithological collections. He is now in Minnesota, engaged in preparing a report on the lithology of that State for the survey under the direction of Prof. N. H. Winchell. The publication of the "Lithological Studies" has not yet been resumed, the work remaining in the condition indicated in the last Report. The work in Minnesota will be of value in the continuance of the "Lithological Studies," especially as a class of rocks is largely represented in the region where Professor Wadsworth now is, with which our collections are very imperfectly supplied.

REPORT ON THE INSTRUCTION IN GEOLOGY, PALÆONTOLOGY, AND PHYSICAL GEOGRAPHY.

By Professors N. S. Shaler and W. M. Davis.

The following courses of instruction were given: —

1. A general elementary course in Geology, consisting of about sixty lectures, together with a course of field lectures on the Geology of the Eastern Part of Massachusetts, by N. S. Shaler. Attended by two hundred and twenty-four students.
2. A course of reading in Geology, intended for beginners who purposed continuing the study in subsequent years, by N. S. Shaler. Attended by seventy-one students.
3. A course in Elementary Minerology and Petrology, likewise intended for those who desired to continue the study of Geology in subsequent years, by Mr. O. W. Huntington. This course was given at Boylston Hall: it was attended by seventy-four students.
4. A course in Advanced Geology, designed as a critical exposition of the science. Sixty lectures, specified field work, and laboratory instruction, by N. S. Shaler and W. M. Davis. This course was attended by forty students.
5. A course in Elementary Palæontology. Sixty lectures, with laboratory work and theses, by N. S. Shaler. This course was attended by twenty-five students.
6. A course of practical field work in Geology, designed for those who purposed to do professional work in Geology, by N. S. Shaler and W. M. Davis. Attended by eight students.
7. A course in Advanced Palæontology, by N. S. Shaler. Attended by one student.

Twelve students were guided in their field work during the long vacation and the College recesses. This work was in part done under the immediate and constant supervision of the instructors, and in part as individual and separate labor, the instructors giving only general guidance.

Two courses of conference meetings were held during the winter months, — one for those who were special students in Geology, the other for students in Palæontology. The instruction was given by theses, and discussions on the subjects of which they treated.

The following publications have been made by N. S. Shaler, viz.: —

1. A series of twenty-five colored geological models and twenty-five photographs of important geological objects, each accompanied by letterpress description, with the assistance of Prof. W. M. Davis and Mr. T. W. Harris. D. C. Heath & Co., Boston.

2. Preliminary Report on the Geology of the Cobscook Bay District, Maine. Amer. Journal of Science, July, 1886, pp. 35–60.

Instruction was given to about forty students in Physical Geography and Meteorology, following much the same scheme of work as in former years. A second year's course in these studies was announced at the beginning of the College term, and was taken by one student, who prepared theses on several subjects, one of which has been published, and another is in preparation for publication, jointly with the instructor. During May and June this student carried on observations on the motion of clouds with instruments constructed for the purpose under his direction.

The following papers have been published by students: —

The Cause of Anti-Cyclonic Cold in Winter, by W. R. Dewey, Class of 1886. Amer. Meteorol. Journal, II., 1886.

Waterspouts on the Gulf Stream in Winter, by H. B. Gibson, Class of 1888. Amer. Meteorol. Journal, III., 1886, pp. 119–126.

The following papers have been published by Prof. Davis: —

Winter on Mount Washington. Science, VII., 1886, pp. 40–42.

Chinook Winds. Science, VII., 1886, pp. 55, 56.

Foreign Studies of Thunderstorms. Amer. Meteorol. Journal, II., 1886.

Cyclones, Anticyclones, and Pericyclones. Amer. Meteorol. Journal, III., 1886, pp. 117–119.

Methods of Study of Thunderstorms. Proc. Amer. Acad., XXI., 1886, pp. 336–347.

Thunderstorms in New England in the Summer of 1885. Proc. Amer. Acad., XXII., 1886, pp. 14–58.

REPORT ON THE INSTRUCTION IN BIOLOGY.

By Professors Farlow, Faxon, and Mark.

The course in Biology (Nat. Hist. 5), conducted by Professors Farlow and Faxon, was taken by thirty-three students, — seven Seniors, seventeen Juniors, one Sophomore, four Scientific students, one Medical student, and three special students. In the laboratory work of this course the Assistant was Mr. W. W. Nolen.

The course in Advanced Zoölogy (Nat. Hist. 6), in charge of Professor Faxon, was elected by twenty-three students, — fifteen Seniors, four Juniors, three Scientific students, and one special student.

During the academic year 1885–86 no instruction was given in Nat. Hist. 9 (Embryology).

Nat. Hist. 2 (Zoölogy), in charge of Dr. Mark, was pursued during the whole year by one hundred and twenty-eight students, of whom one hundred and twenty-four presented themselves for examination, and one hundred and seventeen passed the examinations. The course consisted, as in previous years, of about ninety lectures, accompanied by demonstrations. Somewhat more attention was given to the principal groups of Invertebrates than has been given hitherto, and less to the comparative anatomy of Vertebrates.

By means of an appropriation from the Corporation, supplemented by the Curator, the Embryological Laboratory was furnished with additional microtomes, microscopes, and other apparatus for the purpose of beginning a course in Microscopic Anatomy (Nat. Hist. 13). This course extended over the first half of the year, and was taken by four persons, — two graduates and two students of the Scientific School. In addition to prescribed work, common to all, each student undertook the study of a problem of limited range, and presented the results of his work in a short paper before the class.

Since the last Report, Mr. Locy's paper, "Observations on the Development of *Agelena nævia*," has been published in the Bulletin; and Dr. Mark has reviewed the subject of "Simple Eyes in Arthropods," in a paper which will soon appear in the same publication.

Natural History 7, which has generally been given at the Museum, was this year transferred to the new Botanical Laboratory in Harvard Hall. In the special course of Cryptogamic Botany, in charge of Professor Farlow, (Nat. Hist. 12,) there were four students, — two candidates for S. B., one special Scientific student, and one candidate for Ph.D. Two of the students have prepared papers, which are already in press; one has been at work on two papers, one of which will soon go to press, while the other will be presented as a doctor's thesis; and one student has issued in book form a description of our common genera of Cryptogams, for the use of students. During the year the collections of Dr. Farlow have been consulted by several specialists from other colleges, some of whom remained for several weeks. The amount of instruction given during the year was greater than usual; and, in fact, so much of the time of the instructor was necessarily given to students and persons seeking advice, and to the mechanical duties connected with the care and increase of large collections that the publication of papers already much advanced has been seriously delayed. Practically, original work has been limited to the vacations, — the only time when the Cryptogamic Laboratory has been free from students and work could be carried on by the instructor without interruption. A paper on Arctic Algæ was issued during the year.

REPORT ON OSTEOLOGY.

By D. D. Slade.

During the past year a few articulated skeletons of Mammalia have been received and placed on exhibition ; two of Cetacea have been added to the Atlantic Exhibition Rooms, and several articulated and mounted skeletons received in former years have been removed to the cases prepared for them in the Mammal Storage Room of the upper story.

The collection of disarticulated skeletons remains in excellent condition, and some of the Orders have been rearranged in the drawers, and these properly labelled.

Instruction has been given during the past year in Comparative Osteology by lectures and laboratory work. The course was attended by seven, and a portion of the time by eight students, who were either advanced or special pupils. The interest manifested in the work would indicate that the opportunities now offered for the study of Comparative Osteology — opportunities which can only be possible in connection with a large museum — need only to be more widely known to be appreciated and availed of by students.

REPORT ON THE MAMMALS AND BIRDS.

By William Brewster.

The collection of Mammals and Birds is now practically, if not absolutely, free from insect pests, and, generally speaking, in excellent condition. A reduction in the number of bird skins, similar to that made last year with the mammal skins, has been begun, and already about two hundred damaged or superfluous specimens have been removed. At least twice as many more can be spared to advantage; for the cases are overcrowded, and the cost of storing poor material is usually largely in excess of its value, to say nothing of the positive injury which it often causes to good material, — as, for instance, when greasy or otherwise poorly prepared skins come in contact with spotless ones.

The Museum is indebted to Mr. Agassiz for a score or more of mounted mammals, supplied by Ward to fill gaps in the various faunal collections. Among them are the curious Golden Mole (*Chrysochloris capensis*), the Strand Mole-rat (*Bathyergus maritimus*), the African Buffalo (*Bubalus caffer*), the Aard Wolf (*Proteles lalandii*), and the Hunting Dog (*Lycaon pictus*), from Africa; the Dugong (*Halicore dugong*), from Australia; the Kiang (*Equus kiang*), from Thibet; and, of especial rarity and interest, a fine adult Sea Otter (*Enhydris lutris*), from the Kurile Islands.

The most important addition to the bird collection is that of one hundred and eighty-four skins presented by Mr. Frederick R. King of San Francisco. These are all North American, and the majority West Coast species, several of which are of considerable rarity. Without exception the specimens are in fine condition, and of unusual value, either for mounting or cabinet use. The Museum has also received from Mr. Agassiz a collection of thirteen small mammals and fifteen birds, taken in Orizaba, Mexico, by Pedro M. Toro.

Early in the present year the exhibition cases in the Atlantic and Pacific Rooms were finished, and some progress has been since made towards filling them with appropriate specimens, a number of Seals and about one hundred birds having been either purchased by Mr. Agassiz or mounted from skins previously in the Museum. It is proposed to add to this nucleus as rapidly as possible; but much further time must necessarily elapse before these collections can be brought to anything like completion.

During the past six months single specimens or series of birds or mammals have been sent for study or comparison to Dr. C. Hart Merriam, Mr. Harrison Allen, and Mr. Robert Ridgway.

Since the appearance of the last Report, the Assistant in this department has published the following papers and short notes: —

In "The Auk": —

"Additional Notes on the Nest and Eggs of Swainson's Warbler."

"The Oyster-Catcher (*Hæmatopus palliatus*) in Massachusetts."

"An Ornithological Reconnoissance in Western North Carolina."

"The Bridled Tern (*Sterna anæthetus*) in South Carolina."

"Additions to the Avifauna of Texas."

"*Junco hyemalis* nesting in a Bush."

"The Orange-crowned Warbler in Eastern Massachusetts."

"Additional Notes on Peale's Petrel (*Æstrelata gularis*)."

"*Ægialitis meloda circumcincta* on the Coast of South Carolina."

"*Ammodromus lecontei* near Charleston, South Carolina."

"*Vireo solitarius alticola* at Charleston, South Carolina."

"Occurrence of the Prothonotary Warbler (*Protonotaria citrea*) in Massachusetts."

"An Interesting Specimen of *Helminthophila*."

In the "Memoirs of the Nuttall Ornithological Club": "Bird Migration."

REPTILES AND FISHES.

By Samuel Garman.

Large additions have been made to these collections by the material from the Museum of the Peabody Academy, forwarded by Professor Robinson. Thus far the identification and distribution of the Reptiles and Batrachians only have been attended to. A partial collection of exhibition specimens has been sent in return.

In exchange for specimens previously sent, Dr. Alex. Strauch of the Imperial Museum of St. Petersburg shipped a large series of Reptiles and Fishes, representing a considerable number of species and genera new to the collections.

By purchase from Messrs. C. J. Maynard and Wm. B. Richardson the Museum secured a number of types and many duplicates of species heretofore desiderata. From the duplicates of a collection belonging to Cornell University, sent for identification, quite a number belonging to rare species have been obtained.

A donation by Mr. S. F. Denton includes Reptiles and Batrachians of New Zealand, of Ohio, and an excellent series of species of Massachusetts. Mr. H. S. Greenough kindly presented a fine lot of living snakes from North Carolina. Living lizards and toads rare in this part of the world were received from the Zoölogical Society's Gardens in London.

Besides the foregoing, donations have been received from Dr. C. C. Abbott, Mr. A. Agassiz, Geo. R. Allaman, Prof. B. W. Evermann, Miss A. E. Gooding, F. H. Gould, A. W. Hicks, Alex. H. Higginson, Prof. S. E. Meek, Dr. D. D. Slade, N. Vickary, and Dr. B. G. Wilder.

Shipments have been made to the London Zoölogical Gardens, Dr. Heron-Royer, the Museum of the Peabody Academy, Dr. B. G. Wilder, Prof. O. C. Marsh, Dr. G. Baur, and Dr. H. Ayers. Various specimens also have been turned over to instructors for students' use.

Of the regular work, much has been expended on the collections of skeletons; and a number of large Reptiles have been prepared as skeletons from alcoholic specimens. Especial attention has been given to the reduction of the mass of duplicates, to identification, and to improvement and increase of the collections for exhibition.

REPORT ON THE ENTOMOLOGICAL DEPARTMENT.

By Dr. H. A. Hagen.

The collection has been remarkably free from pests; nothing except some Anthrenus (*A. varius*) larvæ were found. This fact is remarkable, because during the last year in houses in Cambridge, even in some near the Museum, the larva of the carpet-bug (*Anthrenus scrophulariæ*) was very abundant, — much more than during the preceding ten years. The freedom from pests is due to the incessant care of the lady assistant, and to the custom of disinfecting at once any box found to be infested. The collection of Dr. J. L. Le Conte is in excellent condition.

Concerning the part of the collection preserved in alcohol, "Twelve Years' Experience with Rubber Stoppers used in the Biological Collection," by the Assistant, was published in "The Canadian Entomologist," January, 1886. There are in use about 7,200 vials of 6 to 25 mm. diameter (even a few of 50 mm. diameter and 180 mm. length for the larva of *Dynastes Hercules*). Of all stoppers in use, less than one per thousand gives out after twelve years, and in the first six years probably one only per two thousand. Stoppers of larger size keep much better than the smaller ones. Since we began to use rubber stoppers, there has been a great diminution in the amount of alcohol necessary to supply the loss due to evaporation.

The most important addition to the collection are five boxes containing the types of the Carabidæ and Longicornia from Central America, presented by Messrs. Godman and Salvin, of London. The North American collection was enlarged by exchange, or by presents from Mr. S. Henshaw, Boston, Mr. G. Jack, Montreal, Mr. Theo. Lyman, Prof. W. G. Farlow, Mr. W. Cabot, and Mrs. Towner, Cambridge; and by biological specimens collected by the Assistant. Gaps in the Le Conte collection were filled as usual by presents from Dr. G. H. Horn, Philadelphia.

The Longicorns presented by Messrs. Godman and Salvin necessitate a partly new arrangement of this family. There are now above 3,600 species represented in the collection, — about the half of all species known. The Cave Insects have been rearranged, on account of the additions made to our collections from the Peabody Academy; and the Tineina of Mr. V. Chambers also, on account of the identifications of Prof. H. Frey, in Zurich, and of Lord Walsingham, in England.

The Embidina, Nemoptera, and Micromus of the collection have been monographed and brought in order by the Assistant, as well as a part of the Odonata.

Several parts of the collection have been studied (generally at the Museum) by Dr. G. H. Horn, Philadelphia; Mr. N. Blanchard, Lowell, Mass.; Rev. Geo. D. Hulst, Brooklyn, N. Y.; Mr. P. R. Uhler, Baltimore, Md.; Mr. J. B. Smith, Washington, D. C.; Mr. S. Henshaw, Boston, Mass.; and Mr. G. Jack, Montreal. The results of their studies have been embodied by them in various publications.

1. Myriapoda Musei Cantabrigiensis. Pars I. Chilopoda, by Dr. Meinert. In Proc. Amer. Philos. Soc., April, 1886, No. 122, Vol. XXIII.
2. A Revisional Monograph of Recent Ephemeridæ. By Rev. A. E. Eaton. Part IV. Trans. Linn. Soc. London, Vol. III., December, 1885.
3. Die Spinnen Amerikas; Therididae, zweite Hälfte, von Graf E. Keyserling. Nürnberg, 1886. 4to.

The publications of the Assistant during the last year are: Bibliographical Contributions, by J. Winsor, p. 34, No. 63 to 83; besides the beginning of a monograph of Hemerobidæ, Parts I. and II., printed in May for the Proceedings of the Boston Natural History Society, but not yet distributed; and some papers in the Entomologica Americana, Vol. II.

The collection received from the Peabody Academy has been carefully studied to ascertain the types of described species now belonging to the Cambridge Museum. Though this work is only begun, I have to state that the number of types is very much larger than it was supposed to be.

The types of Prof. A. S. Packard are the first ones to be ascertained. His types of the Phalænidæ are at hand, except 15 (not 13, as stated in my last Report), — 11 of them described from specimens belonging to other entomologists. Prof. A. S. Packard has kindly offered to fill these gaps. Although all his previous papers on Phalænidæ are recorded in his Monograph, I have nevertheless carefully compared those papers, and checked off the types present.

The papers on Bombycidæ and Zygænidæ in the Proceedings of the Philadelphia Entomological Society for 1864, and in the Fourth Report of the Peabody Academy, 1872, were carefully compared, and after this had been done, the North American species newly arranged. Of the species described in the first paper, only two types are wanting, — *Platanotia modesta* and *Œdemasia nitida.* Of the species contained in the second paper, only five are wanting, described from specimens belonging to other entomologists. Of his paper on the Lepidopterous Fauna of Labrador (Proc. Bost. Nat. Hist. Soc., 1866,) among the Diurna and Bombycidæ only three are wanting.

The types of the Hymenopterous and Lepidopterous Insects collected by Prof. J. Orton for the Smithsonian Institution in South America (Rep. Peabody Acad., I.) are of course in the Museum of this institution; but of the insects collected in Pebas, Ecuador (Rep. IV., 1872), the types of the four described Lepidoptera are present.

The Coleoptera from Labrador (Rep. IV., p. 92), all but twelve, are present. Of the types of the Synopsis of the Thysanura (Rep. V., p. 23), all the Texan species, and a number of the others, are present. They are about the only Thysanura in the collection.

A comparative exhibition of the Insects of all parts of the globe would be for the Museum a feature equally interesting and instructive, the more so as it has not been tried by any other Museum. At first I had no doubt that such an exhibition could be effected, at least to a large extent, with the material actually at hand, though the best first-class specimens had been used before, especially in the unusually large systematic exhibition. Of course some preparatory work was needed, and was begun directly. But the work grew unexpectedly large and daily larger, as important groups and families had to be brought together and studied again. In fact, during the last five months this work occupied nearly the whole time of the Assistant.

Finally, I decided to try first the exhibition for Europe, because its fauna is the most familiar one. After having filled two boxes with butterflies, — the large number of Argynnidæ is a prominent character of the European fauna, — the Coleoptera were begun with the Carabidæ, also a prominent character of this fauna. But here the larger part of the species are of small size, and therefore not fit for exhibition. The same objection in other groups made it very doubtful if the place allotted to beetles could be filled in a proper manner. Then I endeavored to make a very careful review of the insects belonging to the fauna of Europe and Siberia, to decide the best arrangement of them for the exhibition with the material actually at hand. The result was very discouraging. Siberia is wanting; the west of Europe (Great Britain, France), the south (Spain, Portugal, Italy, Turkey, Greece), and the east (the vast territory of Russia) are, except some isolated species, not represented in the collection. Only Dr. Jmhoff's collection from Switzerland represents all orders, but the old specimens are often unfit for exhibition. From adjacent parts in Germany, some fine butterflies and beetles are at hand. The subalpine character of the north of Europe is to some extent represented by the insects from Switzerland. After having clearly faced the question, I should say that it may be with some difficulty possible to make this part, with the insects enumerated above, belonging to a small part of Central Europe. But this exhibition cannot be considered as representing the fauna of Europe and Siberia.

To gain more experience for my work, I postponed finishing the European exhibition, and began that for South America, which is more fully represented in the collection. After having filled three boxes with Lepidoptera, and two with beetles, all the rest has to go in one box. Though always the best specimens were selected, the exhibition is very far from satisfactory. The contents of the collection are nearly all from Brazil, with some fine Coleoptera from Cordova, in the Argentine Republic. With rare exceptions, the part south from Brazil, the exceptional interesting fauna of the west (Chili, Peru, Ecuador) is wanting; the large country north of the Amazon is only represented by isolated specimens. Diptera and Hymenoptera are almost wanting.

The Asiatic exhibition will be similar to the South American. The good and showy specimens of Lepidoptera and Coleoptera are all from Rev. M. Carleton's collection in the Himalaya. China and Japan are poorly represented, and the islands of the large Archipelago only by some exceptional insects.

For the Australian exhibition I presume a very small collection may be exhibited; for Africa and Madagascar, even less.

REPORT ON THE CRUSTACEA.

By Walter Faxon.

Two important acquisitions have been made within a year; viz. a set of the deep-sea Crustacea dredged by the United States Fish Commission steamer "Albatross" (27 species, 218 specimens, determined by Prof. S. I. Smith), and a large lot of alcoholic Crustacea, selected by me last November from the collection of the Peabody Academy of Science at Salem. This addition to the Museum collection is a very valuable one on account of the numerous types of species described by Packard, Smith, Kingsley, and others, that are included in it, as well as on account of the intrinsic nature of the specimens.

The Systematic, North American, and Synoptic collections in the Exhibition Rooms were carefully revised last winter, gaps in the series were filled, and all the old specimens transferred from card-board to slate tablets.

REPORT ON THE RADIATES.

By J. Walter Fewkes.

The most important addition to the collection of Radiates during the past year is a number of desirable specimens, mostly identified, from the Museum of the Peabody Academy at Salem. These are well preserved, and a valuable acquisition especially to our collection of Echinoderms.

A set of all our deep-sea ocean deposits has been sent to the Rev. A. M. Norman. A few rare deep-sea Echinoidea were sent to Professor Duncan, and specimens of ocean bottoms have been picked out for Mr. Murray.

The Assistant has been consulted by several persons in regard to the identification of specimens and comparison with types. In one instance, he has identified for use in the school-room a collection illustrating the Marine Invertebrate Fauna of New England.

A representative collection of Corals has been put on exhibition in the African Room, and a number of mounted Sponges added to those already on exhibition in the Systematic collection.

Faunal representative genera of Molluscan shells, selected from the general collection by the late Professor Hamlin, have been mounted and placed on exhibition in the African and South American Rooms.

The alcoholic Bryozoa, Tunicata, Pteropoda, and Heteropoda stored in the cellar have been assorted preparatory to a special study.

During the year I gave a course of about thirty lectures on the Radiates of the New England coast. These lectures were attended by twelve persons, Scientific students, post-graduates, and others not members of the University.

A special student worked in my room on Systematic Zoölogy six hours a week during the year. Several others took laboratory instruction. The work of two students in the Marine Laboratory at Newport during August and September was conducted under my direction. In the spring recess a dredging excursion, in which I was accompanied by six students, was made to Provincetown. I made a collecting trip to the coast of New Brunswick and to Grand Manan in the month of July.

The Museum has published for me in its Bulletin a preliminary account of my observations on the development of Ophiopholis and Echinarachnius. There have also been published a report on the Medusæ collected by the Lady Franklin Bay Expedition, and a preliminary account of the Medusæ found by the United States Fish Commission steamer "Albatross." The former will be found in an Appendix to Lieut. Greely's book on his Arctic experiences; the latter, in the Report of the Fish Commission for 1884.

REPORT ON PALÆONTOLOGY.

By Alpheus Hyatt.

Since the first of May, when the palæontological collections of Invertebrates were placed under my charge, the following work has been done. A general review of the collections was made, and their existing condition ascertained. This process, owing to their extent, and to the fact that several of them remain still unarranged or in their original wrappers, occupied considerable time. A plan of rearrangement for the whole collection has been decided upon, and a system of labels devised for the trays, with the aid of Mr. Robert T. Jackson.

With the assistance of the same gentleman the Taylor and Day collections have been rearranged, and are ready for distribution; the Dyer and the Walcott collections are also nearly ready for distribution. About one third of the Schary collection has been unpacked. This is of such size that two persons, though occupied constantly, could barely have accomplished the work in three months with due care for the safety of the labels and often delicate and unique specimens. The exquisite preservation and number of the specimens and the costly preparations make this collection by far the most perfect of its kind I have ever seen.

A collection for the use of students and another of specimens particularly well adapted for exhibition have been begun. The fossil Protozoa, Hydrozoa, and Corals have been brought together, and placed in the room destined for their reception. The fossil plants still remaining in the Day, Dyer, and other collections, which had not been already laid aside by my predecessor, the late Professor Hamlin, have been brought together, and the trays appropriately labelled.

REPORT ON THE LIBRARY.

By Miss F. M. Slack.

During the year ending September 1, 1886, the Library has been increased by 549 volumes, 1,396 parts, and 108 pamphlets.

	VOLUMES.	PARTS.	PAMPHLETS.
Gift	25	22	15
Exchange	159	484	41
Purchase	67	104	12
A. Agassiz	101	786	40
Binding Parts	197		
	549	1396	108

The number of volumes now in the Library (exclusive of pamphlets and the Whitney Library) is 16,989. There are 9,082 pamphlets bound in 1,218 volumes, making the total number of volumes 18,207.

[A.]

PUBLICATIONS

OF THE

MUSEUM OF COMPARATIVE ZOÖLOGY

FOR THE ACADEMIC YEAR 1885-86.

Of the Bulletin.

Vol. XII.

No. 2. Reports on the Results of Dredging by the United States Coast Survey Steamer "Blake."—XXVII. Report on the Specimens of BOTTOM DEPOSITS. By JOHN MURRAY. 25 pp. October, 1885.

No. 3. Contributions from the Embryological Laboratory. — VIII. Observations on the Development of AGELENA NÆVIA. By WILLIAM A. LOCY. 41 pp. 12 Plates. January, 1886.

No. 4. Studies from the Newport Marine Laboratory. — XVII. Preliminary Observations on the Development of OPHIOPHOLIS and ECHINARACHNIUS. By J. W. FEWKES. 48 pp. 8 Plates. March, 1886.

No. 5. Reports on the Results of Dredging by the United States Coast Survey Steamer "Blake." — XXVIII. Description of thirteen Species and two Genera of FISHES from the "Blake" Collection. By G. BROWNE GOODE and TARLETON H. BEAN. 28 pp. July, 1886.

No. 6. Reports on the Results of Dredging by the United States Coast Survey Steamer "Blake." — XXIX. Report on the MOLLUSCA. Part I. BRACHIOPODA and PELECYPODA. By W. H. DALL. 148 pp. 9 Plates.}

Vol. XIII.

No. 1. Reports on the Results of Dredging by the United States Coast Survey Steamer "Blake."—XXX. Report on the HOLOTHURIOIDEA. By H. THÉEL. 21 pp. 1 Plate. (In press.)

No. 2. Simple Eyes in ARTHROPODS. By E. L. MARK. With Plates. (In press.)

No. 3. The Lateral System of SELACHIANS. By SAMUEL GARMAN. With Plates. (In press.)

Of the Memoirs.

Vol. IX.

Selections from Embryological Monographs. Compiled by ALEXANDER AGASSIZ, W. FAXON, and E. L. MARK. Nos. 1–3 have been issued.

(*To be continued.*)

Vol. XI. LITHOLOGICAL STUDIES. By M. E. WADSWORTH.

(*To be continued.*)

Vol. XIV. Studies from the Newport Marine Laboratory. — XVI. Development of OSSEOUS FISHES. Part II. By ALEXANDER AGASSIZ and C. O. WHITMAN. (In press.)

Vol. XV.

No. 1. Reports on the Results of Dredging by the United States Coast Survey Steamer "Blake." — XXXI. Report on the ANNELIDS. By ERNST EHLERS. With Plates. (In press.)

Also preparing: —

Illustrations of North American Marine Invertebrates, from Drawings by Burkhardt, Sonrel, and A. Agassiz, prepared under the Direction of L. Agassiz. Selections from Embryological Monographs, compiled by A. Agassiz, W. Faxon, and E. L. Mark (discontinued for the present). Papers by E. L. Mark, on the Development of Lepidosteus and of Arachnactis; by A. Agassiz and C. O. Whitman, on the Embryology of Bony Fishes; by A. Hyatt, on Cephalopods; by M. E. Wadsworth; and, in Connection with the Geological Survey of Kentucky, by Prof. N. S. Shaler, on the Brachiopoda of the Ohio Valley.

Reports on the Dredging Operations for 1877, 1878, 1879, and 1880, in Charge of Alexander Agassiz, by the U. S. Coast Survey Steamer "Blake." H. B. Brady (Foraminifera), P. H. Carpenter (Comatulæ), W. H. Dall (Mollusks of the Gulf of Mexico and the Caribbean Sea), G. B. Goode and T. H. Bean (East Coast Fishes and Fishes of the Gulf of Mexico and the Caribbean Sea), A. E. Verrill and W. H. Dall (East Coast Mollusks), A. A. Hubrecht (Nemerteans), A. Milne-Edwards (Crustacea), and A. E. Verrill (Alcyonaria).

General Report on the Cruises of the "Blake." By Alexander Agassiz.

[B.]

INVESTED FUNDS OF THE MUSEUM.

In the hands of the Treasurer of Harvard College, Sept. 1, 1886.

Sturgis-Hooper Fund	$100,000.00
Gray Fund	50,000.00
Agassiz Memorial Fund	297,933.10
Teachers and Pupils Fund	7,594.01
Permanent Fund	117,469.34
Humboldt Fund	7,740.66
	$580,737.11

The payments on account of the Museum are made by the Bursar of Harvard College on vouchers approved by the Curator. The accounts are annually examined by a committee of the Museum Faculty. The only funds the income of which is restricted, the Gray and the Humboldt Funds, are annually charged in an analysis of the accounts with vouchers to the payment of which the income is applicable.

The income of the Gray Fund can be applied to the purchase and maintenance of collections, but not for salaries.

The income of the Humboldt Fund can be applied for the benefit of one or more students of Natural History.

3 2044 106 267 081

DATE DUE

~~3/31/98~~

F~~EB 0 4~~ 2003

DEMCO, INC. 38-2931